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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/600,206	11/13/2000	Graham O'Neill	22749/04002	7913

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CALFEE HALTER & GRISWOLD, LLP
800 SUPERIOR AVENUE
SUITE 1400
CLEVELAND, OH 44114

EXAMINER

MICHALSKI, JUSTIN I

ART UNIT PAPER NUMBER

2615

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/600,206	Applicant(s) O'NEILL ET AL.	
	Examiner Justin Michalski	Art Unit 2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11, 12 and 30-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 40 and 41 is/are allowed.
- 6) ☒ Claim(s) 11, 12 and 30-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see page 7 and 8, filed 28 December 2005, with respect to the rejection(s) of claim(s) 30 under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly found art.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 11 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 11 recites the limitation "the third and fourth filters" in lines 1 and 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitation "the half-wave rectification means" in lines 1 and 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 30, 31, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Michelson (US Patent 4,400,590) in view of Murayama et al. ("Murayama") (US Patent 6,141,425) in further view of Ngarmnil et al. (Hereinafter "Ngarmnil") (Ngarmnil, J. et al., "A fully tuneable micropower log-domain filter", IEE Colloquium on Low Power Analogue and Digital VLSI: ASICS, Techniques and Applications, London, 2 Jun 1995 Page(s) 9/1 - 9/4).

Regarding Claim 30, Michelson discloses a multi-channel analogue audio signal processor (Fig. 1) for use with a cochlear prosthesis, comprising: an input (transducer 10) for receiving an audio signal; a plurality of outputs for connecting to respective ones of cochlear implant electrodes (18); a plurality of analogue signal processing channels coupled to the input (Channels from 12 to 18), each channel comprising a tone control circuit (filter 14), and a tone generator (electrode array 18) for generating tones of preset amplitude (driver 16) and frequency dependent on the fundamental frequencies of the filters of the channels (filters 14).

Michelson does not disclose the tone control circuit comprising first and second log-domain filters having different low-pass bands and a subtractor for subtracting the output currents of the filters to produce a filtered signal, each of the filters comprising MOS transistors operating in weak inversion, and each filter being tunable in the audio frequency range to adjust the low-pass cut-off frequency. It is known in the art that the subtraction of two parallel low-pass filters will produce a band-pass output. Therefore it

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would have been obvious to one of ordinary skill in the art at the time the invention was made to use the subtraction of two low-pass filters as an alternative to the band-pass filters (14) of Michelson. Although Michelson does not disclose subtraction of an output current Murayama discloses producing a filtered output of filters (31A, 31B, and 31C) by combining current outputs. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to produce a filtered output by using output currents for a more specific filtered output.

Ngarmnil discloses a log domain MOS transistor filter operating in weak inversion and the cut-off frequency of the filter can be tuned via a current source (Page 9/1, I and II). Ngarmnil further discloses that the log-domain filter is very attractive to low power filters and very suitable for the applications in biomedical signal processing such as filters for electronic cochlea (Page 9/3, Conclusion). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the cochlear implant of Michelson with the low-pass filter as disclosed by Ngarmnil since Ngarmnil discloses it is very suitable for biomedical applications such as electronic cochlea and in order to produce a circuit requiring less power consumption.

Regarding Claim 31, Michelson further discloses each channel comprising an amplifier (driver 16) having controllable gain (Column 5, lines 12-16).

Regarding Claim 36, Michelson further discloses separate filters (14) and drivers (16) that can independently adjusted by channel.

6. Claims 32-35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Michelson as modified as applied to claim 30 above, and further in view of Müller et al. (US Patent 5,814,095).

Regarding Claims 32 and 35, Michelson as modified discloses a processor as stated apropos of claim 32 but does not disclose use adjustments transmitted by a wireless remote control. Müller et al. discloses an implantable device whose audiological functions can be transcutaneously controlled by remote control to adapt to ambient acoustic conditions (Column 11, lines 25-41). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a remote control to change operating parameters for adapting to ambient acoustical conditions resulting in a higher quality audio signal.

Regarding Claim 34, Michelson further discloses tone generator control means for selecting the frequency of the tone produced by the tone generator (frequency components can be shaped to the requirements of the user (i.e. frequency can be selected)) (Column 2, lines 40-43).

7. Claims 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Michelson as modified as applied to claim 30 above, and further in view of Zierhofer (US Patent 5,983,139).

Regarding Claim 37, Michelson as modified discloses a processor as stated in claim 30 but does not disclose sampling means coupling the channels to the outputs. Zierhofer discloses continuous interleaved sampling successfully achieved high levels

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of speech recognition (Column 1, lines 13-16). Therefore, it would have been obvious to one of ordinary skill at the time the invention was made to implement sampling to create a high level of speech recognition with a cochlear implant.

Regarding Claim 38, Zierhofer further discloses the sampling means comprises a continuous interleaved sample generator (Column 1, lines 13-16).

8. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Michelson as modified as applied to claim 30 above, and further in view of Shannon (US Patent 5,549,658). Michelson as modified discloses a processor as stated in claim 30 but does not disclose the use of biphasic generators. Shannon discloses sampling means for applying samples of the frequency-separated signals to the respective biphasic signal generators (Column 14, lines 7-24). Shannon et al. teaches biphasic signals permit signals to be inductively coupled through the skin with reasonable efficiency (Column 15, lines 27-35). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a biphasic signal to efficiently couple an electric signal through the skin.

9. Claims 42-48, are rejected under 35 U.S.C. 103(a) as being unpatentable over Orban (US Patent 4,525,857) in view of Ngarmnil et al. (Hereinafter "Ngarmnil") (Ngarmnil, J. et al., "A fully tuneable micropower log-domain filter", IEE Colloquium on Low Power Analogue and Digital VLSI: ASICS, Techniques and Applications, London, 2 Jun 1995 Page(s) 9/1 - 9/4).

Regarding Claim 42, Orban discloses an analogue signal processor (Fig. 2), comprising an audio signal input (40), an output (46) for providing a processed audio output signal, and a tone control circuit coupling the input and the output and comprising first (60) and second (62) filters having different low-pass bands and a subtractor (76) for subtracting the output currents of the filters to produce a filtered signal (46). Orban does not disclose the filters being log-domain MOS transistors operating in weak inversion and being tuneable in the audio frequency range to adjust the low-pass cut-off frequency. Ngarmnil discloses a log domain MOS transistor filter operating in weak inversion and the cut-off frequency of the filter can be tuned via a current source (Page 9/1, I and II). Ngarmnil further discloses that the log-domain filter is very attractive to low power filters and very suitable for the applications in biomedical signal processing such as filters for electronic cochlea (Page 9/3, Conclusion). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the cochlear implant of Orban with the low-pass filter as disclosed by Ngarmnil since Ngarmnil discloses it is very suitable for biomedical applications such as electronic cochlea and in order to produce a circuit requiring less power consumption.

Regarding Claim 43, Ngarmnil further discloses a log converter (i.e. compressor) (Figure 1) coupling the input of a tone control circuit for compressing the dynamic range of the input signal.

Regarding Claim 44, it would have been obvious to one of ordinary skill in the art at the time the invention was made that a voltage-to-current converter would be a

possible mode of implementation for the compressor as illustrated by Waldhauer (US Patent 4,882,761) (Column 2, lines 51-56).

Regarding Claim 45, Ngarmnil further discloses the MOS transistors operating in weak inversion (Page 9/1, II).

Regarding Claim 46, Ngarmnil further discloses that compressor (Fig. 1) provides control of sensitivity (Page 9/1, I).

Regarding Claim 47, it would have been obvious to one of ordinary skill in the art at the time the invention was made that an amplifier could be placed after the tone control circuit for increasing the output to a desired level.

Regarding Claim 48, Ngarmnil further discloses the input of Figures 1 and 2 being a current source (i.e. current signal).

10. Claim 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orban as modified as applied to claim 1 above, and further in view of Shannon et al. (US Patent 5,549,658).

Regarding Claim 49, as stated above apropos of claim 42, Orban as modified makes obvious all elements of that claim but does not disclose a biphasic signal generator for supplying a biphasic signal. Shannon et al. discloses a biphasic signal generator (Figure 5, generator 72) for supplying to the output a biphasic signal modulated by the processed audio output signal. Shannon et al. teaches biphasic signals permit signals to be inductively coupled through the skin with reasonable efficiency (Column 15, lines 27-35). Therefore, it would have been obvious to one of

ordinary skill in the art at the time the invention was made to use a biphasic signal to efficiently couple an electric signal through the skin.

Regarding Claim 50, Orban discloses a processor as stated in claim 42 but does not disclose full-wave rectification. Shannon discloses the use of full-wave rectifier circuits RECT1-4 and effectively derives the instantaneous envelope of the audio signals in the band. (Column 12, line 65 through Column 13, line 4). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include full-wave rectifiers to effectively derive the instantaneous envelope of the audio signal as taught by Shannon.

Allowable Subject Matter

11. Claims 40 and 41 allowed.

Conclusion


12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin Michalski whose telephone number is (571)272-7524. The examiner can normally be reached on M-F 7-3:30.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571)272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JIM


March 16, 2006


VIVIAN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600